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ABSTRACT

A two-part study manipulated structure demands (sequencing ideas, forming sentences, and complying with punctuation/spelling mechanics) in a persuasive writing task to measure the resulting effects on content operations (generating arguments/propositions). In part one of the study, 40 graduate students wrote preliminary and final drafts in one of four conditions that varied according to the amount of structure demands. It was found that the elimination of each structure operation increased the production of persuasive arguments. In the second part of the study, 60 undergraduates wrote their preliminary drafts in their "typical" writing strategy (control group), in an unordered-proposition format (no structure constraints), or in a polished-sentence format (structure constraints). The writers with average verbal ability benefited more from the elimination of structure operations than did writers of low verbal ability. In the control group, writers with average verbal ability usually selected proposition-based formats (outlines and diagrams) that dispensed with the need for structure operations. Writers with average verbal ability also produced more sentences, more arguments per sentence, and fewer errors in mechanics than did writers with low verbal ability. Overall, the results were considered empirical justification for the use of freewriting techniques, which eliminate premature editing that can block the production of ideas. (RL)

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Content and Structure Demands of Persuasive Documents

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Abstract

In two experiments, college students wrote preliminary and final drafts of a persuasive document. In Experiment 1, the need for writers to comply with mechanics (punctuation and spelling), to form complete sentences, and to sequence their ideas, respectively, were eliminated one at a time from preliminary-draft formats. The elimination of sentence-formation and sequence operations produced corresponding increments in persuasive argument production. In Experiment 2, writers with average verbal ability were found to benefit more from the elimination of these structure operations than writers with low verbal ability. When allowed to choose freely their typical preliminary-draft format, writers with average verbal ability usually selected proposition-based formats (e.g., lists, outlines, and diagrams) that dispensed with the need for structure operations. Writers with average verbal ability also produced more sentences, more arguments per sentence, and fewer mechanics errors than writers with low verbal ability. In both experiments, preliminary-draft arguments that were transferred during revision constituted the majority of final-draft arguments; comparatively few new arguments were constructed during revision.

Writing and Revising Persuasive Documents

Document production is a pervasive, time-consuming activity. For example, in business offices, personnel spend an estimated 19% of their working day writing memos, letters, and technical reports (Klemmer & Snyder, 1972). A statistic such as this underscores the importance of understanding the nature of the demands that document production places on the human information processing system. When these demands are understood, training programs intended to develop the information planning and management activities of writers can be made more effective (Frase, in press; Frase, Note 1; Gould, 1978, 1979).

A writer must cope with demands from two sources: content and structure. Content demands are associated with the production of sound ideas, whereas structure demands are associated with the formation of cohesive sentences. It has been argued that when writing tasks are particularly difficult, attempts to satisfy content and structure demands simultaneously may tax a writer's processing capacity and "block" the formation of ideas (Bereiter, 1980; Bruce, Collins, Rubin, & Gentner, Note 2; Flower & Hayes, 1980). Processing capacity is defined here as "the limited pool of energy, resources, or fuel, by which some cognitive operations or processes are mobilized and maintained" (Johnston & Heinz, 1978, p. 442).

A referential or descriptive document simply reproduces world events. A persuasive document, on the other hand, can initiate or change such events. By communicating opinions and selectively manipulating facts,

these documents must prompt some choice or action from an audience. For this reason, the production of a persuasive document is a particularly demanding task.

When writers produce preliminary and final drafts of persuasive documents, they are assumed to engage in at least four specific operations: (1) generation of arguments, (2) sequencing of arguments, (3) placement of arguments into sentences, and (4) compliance with punctuation and spelling mechanics (see Hayes & Flower, 1980; Kintsch, in press; Bruce et al., Note 2, for detailed descriptions of writing operations). The first operation satisfies a content demand; the latter three satisfy structure demands.

Experiment 1

In the first experiment, the structure demands associated with the production of persuasive documents were manipulated. If structure demands were relaxed during the production of preliminary drafts, it was reasoned that writers would be able to allocate more processing capacity to content demands. The increment in capacity allocation that was made possible by the relaxation of structure demands was expected to enhance both the quantity of arguments produced and the efficiency of their presentation.

Method

Subjects and design. Subjects were 40 teachers (22 female and 18 male) enrolled in a graduate course in educational psychology at the University of Georgia. All participated on a voluntary basis. Subjects were randomly assigned to four preliminary-draft formats in which structure demands were eliminated one at a time. Specifically, subjects

generated either ordered arguments in polished (mechanically correct) sentences, ordered arguments in sentences without mechanics, ordered arguments in the form of propositions (idea units), or unordered arguments in the form of propositions. Following construction of a preliminary draft, all subjects developed final drafts under identical requirements.

Procedure. When a writer persuades an audience to do something, it is usually in lieu of doing something else. For this reason, two concrete alternatives were specified in the description of the experimental task. Subjects were to persuade their instructor, by means of a formal business-type letter, to use a future lab class for either a content-related film (alternative one) or a library reading session (alternative two).

Past experience suggested that both of these "lab day" activities were quite acceptable to all subjects. Freedom to choose one activity over the other was an important component of the letter-writing task, because without such freedom, there was less assurance that subjects would be motivated to persuade effectively. Subjects were further motivated by the knowledge that their arguments truly would have an impact on their audience's decision:

> Your instructor will read your letters carefully. Decisions about which activity (film or library reading) is the best choice for the next lab class will be determined by the quantity and quality of sensible, persuasive arguments you can communicate. Your arguments must convince your instructor to do one activity and not the other.

In groups of four to eight, each subject wrote two 10-minute drafts, a preliminary and a final, that were separated by a five-minute rest period. Because writers in applied settings (e.g., business firms and government agencies) usually work under time constraints, the writing time of subjects was controlled. Subjects budgeted their time (with stopwatches) to ensure that they finished each draft within the allotted period of time. During the rest period, subjects were permitted to get up out of their seats; however, they were not allowed to talk to one another.

1. Preliminary-draft formats. Subjects in the polished sentence format endeavored to produce a finished product on their first draft. In addition to the demand of content, they were required to satisfy three demands of structure -- sequence, sentence formation, and mechanics. Mechanics, in this context, involved punctuation and spelling. Orienting directions for this format were as follows:

> On this preliminary draft, you need to be concerned with content (i.e., the production of persuasive ideas), order (i.e., the logical sequence of these ideas), sentence formation (i.e., the incorporation of these ideas into sentences), and mechanics (i.e., compliance with punctuation and spelling rules). Communicate all the ideas that you think may be useful in persuading me to choose one alternative and not the other. More than one persuasive idea can be incorporated into each sentence.

In the mechanics-free sentence format, the demand to attend to punctuation and spelling was relaxed. Thus, orienting directions were modified to include the following statements:

> On this preliminary draft, you need to be concerned with content (i.e., the production of persuasive ideas), order (i.e., the logical sequence of these ideas), and sentence formation (i.e., the incorporation of these ideas into sentences). Communicate all the ideas that you think may be useful in persuading me to choose one alternative and not the other. More than one persuasive idea can be incorporated into each sentence.
>
> On this draft, do not attempt to work on mechanics (i.e., compliance with punctuation and spelling rules). You will be permitted to work on mechanics during the next draft.

In the ordered proposition format, the mechanics and sentence-formation demands were eliminated. Subjects were instructed to produce arguments in the form of ordered, raw ideas:

> On this preliminary draft you need to be concerned with content (i.e., the production of persuasive ideas) and order (i.e., the logical sequence of these ideas). Communicate all the ideas that you think may be useful in persuading me to choose one alternative and not the other. Summarize each of these persuasive ideas using only two or three words. As you write each persuasive idea, place a number next to it to indicate the approximate position it should occupy or your final draft.

On this draft, do not attempt to work on sentence formation (i.e., the incorporation of persuasive ideas into sentences) or mechanics (i.e., compliance with punctuation and spelling rules). You will be permitted to work on sentence formation and mechanics during the next draft.

In the unordered proposition format, subjects satisfied only a content demand. They were instructed to produce unordered, raw ideas:

On this preliminary draft you need to be concerned with content (i.e., the production of persuasive ideas). Communicate all the ideas that you think may be useful in persuading me to choose one alternative and not the other. Summarize each of these persuasive ideas using only two or three words, and write them in any order.

On this draft, do not attempt to work on order (i.e., the logical sequence of persuasive ideas), sentence formation (i.e., the incorporation of these ideas into sentences), or mechanics (i.e., compliance with punctuation and spelling rules). You will be permitted to work on order, sentence formation, and mechanics during the next draft.

In addition to their specific preliminary-draft format instructions, all subjects initially were told the following:

Budget your time to ensure that you finish this initial draft in the ten minutes permitted. On the final draft, you will have another opportunity to improve your ideas.

2. Final draft. On the final draft, all subjects were instructed to generate a finished product with consideration given to content production, order, sentence formation, and mechanics. Essentially, their instructions included those administered for the polished sentence format with the following additions:

> Try to produce the best letter you can on this final draft. Make any changes (additions, deletions, and substitutions) of preliminary-draft ideas that you think will improve this final version. You may refer back to your first draft; however, do not put any marks on that first draft.

Preliminary-draft materials were made available to all subjects during final-draft construction.

Performance measures. The content of the preliminary and final drafts was reduced to propositional units by means of Kintsch's (1974, in press) discourse analysis system. Those propositions that complemented the implied or explicit statement, "This alternative is preferred (or not preferred) because....," were designated either pro or con arguments, respectively.[1] Thus, a writer who favors a content-related film may argue both pro (e.g., "a film visually illustrates how to put a psychological principle into practice") and con (e.g., "library readings do not always use the same terminology"). Similarly, a writer who favors a library reading session may argue both pro (e.g., "a library reading session allows me to look up original experiments that

have been discussed in class") and con (e.g., "a film doesn't permit me to skip over content I already know"). A writer received credit only for those arguments that were plausible and logical. The interrater reliability for argument identification was .92.

Several gross structural characteristics of the final drafts alone were also assessed. These characteristics included the following: sentence production (total number of sentences produced), syntactic complexity (average number of clauses per sentence), and argument-presentation efficiency (average number of arguments per sentence).

Results and Discussion

First, analyses of preliminary-draft content and final-draft content were conducted to assess the effect of preliminary-draft format. Next, several analyses of structure were performed to determine the effect of preliminary-draft format on (1) sentence production, (2) syntactic complexity, (3) mechanics, and (4) argument-presentation efficiency.

Content. On the preliminary and final drafts, arguments were constructed in favor (pro) of one alternative and against (con) the other.[2] In Table 1, all argument production means are presented.

Insert Table 1 about here

Two separate analyses of variance were performed, one on preliminary-draft arguments and one on final-draft arguments. Both analyses included one between-subjects factor, preliminary-draft format, and one within-subjects factor, argument type (pro and con).

1. Preliminary-draft arguments. A significant main effect was found for preliminary-draft format, F (3, 36) = 16.10, $p < .001$, $MS_e = 6.07$. The Newman-Keuls tests performed on the mean preliminary-draft totals in Table 1 indicated that significant increments in argument production accompanied the elimination of the sentence-formation and the sequence demands imposed by the preliminary-draft formats. Specifically, argument production was low and not significantly different in the two sentence formats, $p > .05$, higher in the ordered proposition format, both $ps < .05$, and higher still in the unordered proposition format, all $ps < .05$.

There was also a significant effect associated with argument type, F (1, 36) = 23.34, $p < .001$, $MS_e = 7.97$, indicating that more pro arguments were produced than con arguments. This effect may be situation specific -- that is, it may change in response to the kind of alternatives made available to writers. On the other hand, it may reflect a belief of writers that pro arguments generally will have the greatest persuasive impact on their audience.

Finally, the preceding main effects were qualified by a Preliminary-draft Format x Argument Type interaction, F (3, 36) = 4.22, $p < .01$, MS_e = 7.97. This interaction suggested that the formats exerted their primary influence on the production of pro arguments. Newman-Keuls tests indicated that the production of pro arguments was low and equivalent in the two sentence formats, $p < .05$, higher in the ordered proposition format, both $ps < .05$, and highest in the unordered proposition format, all $ps < .01$. The production of con arguments, on the other hand, was unaffected by the preliminary-draft formats, all $ps > .05$.

In general, the argument production findings are consistent with the hypothesis that the relaxation of structure demands during the preliminary draft enables writers to allocate more processing capacity to argument production. The relaxation of the sentence-formation and the sequence demands produced corresponding increments in argument production.

It could be argued that these findings, in part, are due to time constraints. Specifically, the sentence-formation operation might have consumed too much time and made it difficult for writers in the sentence formats to present all of their arguments. The manual work required to write arguments in complete sentences rather than two- or three-word propositions did indeed consume some extra time; however, even if this manual-work component could be eliminated from the sentence-formation operation, it is unlikely that argument production would change much. Writers in the mechanics-free and polished sentence formats had sufficient time to write 7.7 and 6.9 sentences, respectively -- yet they produced only 3.3 and 4.9 arguments, respectively, despite instructions that more

than one argument could be incorporated into each sentence. Thus, writers in the sentence formats had the time and opportunity to manually record more arguments than they did; they simply had less processing capacity available to them than writers in the proposition formats.

It should also be pointed out that the sequence operation that distinguished the unordered and ordered proposition formats required no manual work, and yet it reduced argument production by an average of five arguments. In short, it is reasonable to assume that it was the mental-work component of the sentence-formation operation, and not the manual-work component, that was largely responsible for the observed reduction in argument production.

2. Final-draft arguments. In general, about 87% of the arguments presented on the final draft were preliminary-draft arguments that had been transferred during revision. As can be seen in Table 1, few new arguments were constructed.

The preliminary-draft format had a significant influence on the number of arguments presented on the final draft, F (3, 36) = 9.98, $p < .001$, $MS_e = 2.41$. The Newman-Keuls tests conducted on the mean final-draft totals in Table 1 revealed that the sentence-formation demand imposed during the preliminary draft limited argument presentation on the final draft. Specifically, argument presentation was lower following the polished sentence format than it was following any of the other three formats, all $ps < .05$. Likewise, argument presentation was lower following the mechanics-free sentence format than it was following either the

ordered or the unordered proposition formats; however, only the latter difference was significant, $p < .05$.

On the final draft, more pro arguments were presented than con arguments, F (1, 36) = 13.30, $p < .01$, $MS_e = 5.57$. Furthermore, only the presentation of pro arguments was influenced by the preliminary-draft format -- Preliminary-draft Format x Argument Type interaction, F (3, 36) = 2.92, $p < .05$, $MS_e = 5.57$. Newman-Keuls tests showed that the presentation of pro arguments was lowest following the polished sentence format, higher following the ordered proposition format, $p < .05$, and highest following the unordered proposition format, all ps $< .05$. The formats exerted no other effects on either pro or con arguments, all ps $> .05$.

Structure. A one-way multivariate analysis of variance was used to assess the effect of preliminary-draft format on several structural characteristics of the final drafts. These characteristics were: sentence production, syntactic complexity (clauses per sentence), mechanics (punctuation plus spelling errors), and argument-presentation efficiency (arguments per sentence). Means are presented in Table 2. After a significant effect, F (12, 87) = 2.93,

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Insert Table 2 about here

$p < .01$, was indicated by the multivariate criterion (Wilks' lambda), corresponding univariate analyses were performed. These analyses revealed that the only structural characteristic of the final draft affected by the preliminary-draft format was argument-presentation efficiency, F (3, 36) = 9.19, $p < .001$, $MS_e = .06$. Subsequent Newman-Keuls

tests indicated that the argument-presentation efficiency of the final draft was lower when preliminary-draft arguments were produced in a polished-sentence format than when they were produced in either a mechanics-free sentence, an ordered proposition, or an unordered proposition format, all ps < .05. The latter three formats did not differ significantly from one another, all ps > .05.

Experiment 2

In Experiment 2, writers were undergraduates who varied in their Scholastic Aptitude Test (SAT) verbal ability. It has been suggested that text-processing operations, such as parsing syntax, impose greater demands on individuals of relatively low verbal ability (Britton, Glynn, Meyer, & Penland, in press; LaBerge & Samuels, 1974; Posner & Keele, 1973; Schneider & Shiffrin, 1977). For this reason, writers with average verbal ability were expected to produce more arguments (with greater efficiency) than writers with low verbal ability.

In order to assess the extent to which writers impose structure demands on themselves during production of a preliminary draft, a control format was included in the second experiment. In this control format, writers were encouraged to use their "typical" preliminary-draft production strategy. Thus, it was possible for writers to present their arguments either in the form of sentences or in the form of propositions (e.g., lists, outlines, diagrams, etc.). Document production under this control format was compared to two formats used in the first experiment: (1) the polished sentence format where structure demands were present, and (2) the unordered proposition format where structure demands were absent. In

general, compliance with structure demands during preliminary-draft construction was expected to inhibit overall argument production.

Method

Subjects and design . Subjects were 60 undergraduates enrolled in sections of an introductory educational psychology course. Subjects average (range = 490 to 590; M = 540) and low (range = 290 to 390; M = 350) in SAT verbal ability were assigned to three preliminary-draft formats: a polished sentence format, an unordered proposition format, and a control format.

Procedure. As in Experiment 1, subjects were to persuade their instructor, by means of a formal business-type letter, to use a future lab class for either a content related film (alternative one) or a library reading session (alternative two).

1. Preliminary-draft formats. The polished sentence format required subjects to construct arguments and incorporate them in ordered, well-formed, mechanically accurate sentences. The unordered proposition format, on the other hand, required subjects to satisfy only the content demand. In this format, two or three words were used to summarize each argument. Orienting instructions for the polished sentence format and the unordered proposition format were identical to those used in Experiment 1.

The control format encouraged subjects to use their typical (extra-experimental) preliminary-draft production strategy. The orienting instructions given to control format subjects were as follows:

Communicate all the ideas that you think may be useful in persuading me to choose one alternative and not the other. Communicate your ideas in the rough-draft format that you normally prefer to use. For example, some people simply list raw ideas, or construct outlines, while others prefer to generate their ideas in sentence form.

Budget your time to ensure that you finish this initial draft in the ten minutes provided. On the final draft, you will have another opportunity to improve your ideas.

2. Final draft. On the final draft, all subjects were told to construct a finished product with attention given to argument production, order, sentence formation, and mechanics. Instructions were the same as those used in Experiment 1. Preliminary-draft materials were available to all subjects during final-draft construction.

Results and Discussion

The effects of writers' verbal ability (average vs. low) and preliminary-draft format (polished sentence vs. unordered proposition vs. control format) were examined. Content and structure analyses similar to those of Experiment 1 were performed. In addition, several content analyses were performed exclusively on control-format data.

Content. In Table 3, all argument production means are presented.[3]

Insert Table 3 about here

Two analyses, both consisting of two between-subjects factors, writers'

verbal ability and preliminary-draft format, and one within-subjects factor, argument type, were performed on preliminary and final-draft arguments, respectively.

1. Preliminary-draft arguments. The main effect for writers' verbal ability was significant, F (1, 54) = 12.96, $p < .001$, $MS_e = 4.21$, indicating that more arguments were produced by writers with average verbal ability than low verbal ability. In addition, the Writers' Verbal Ability x Preliminary-draft Format interaction approached significance, F (2, 54) = 2.79, $p < .07$, $MS_e = 4.21$. The Newman-Keuls tests performed on the mean totals in Table 3 suggested that the preliminary-draft format influenced only writers with average verbal ability. For these writers, argument production was lower in the polished sentence format than in the control or unordered proposition formats, $ps < .05$; the control and unordered proposition formats did not differ, $p > .05$. For writers with low verbal ability, on the other hand, production was roughly the same under the three formats, all $ps > .05$. Since only writers with average verbal ability tended to profit from the reduction in structure demands, these findings qualify those of Experiment 1. These findings suggest that writers with average verbal ability probably have more arguments available to them than writers with low verbal ability. When structure demands are reduced, processing capacity is redirected and access to these available arguments is made possible.

Once again, more pro arguments were produced than con arguments, F (1, 54) = 56.56, $p < .001$, $MS_e = 5.48$. No other effects were significant in this analysis.

2. Final-draft arguments. As can be seen in Table 3, the majority of the arguments presented on the final draft (about 85%) were preliminary-draft arguments that were transferred during revision. As was the case in Experiment 1, only a few new arguments were constructed.

Writers' verbal ability had a significant effect, F (1, 54) = 9.11, $p < .01$, $MS_e = 3.74$, indicating that more arguments were presented on the final draft by writers with average verbal ability than low verbal ability. The Writers' Verbal Ability x Preliminary-draft Format interaction also was significant, F (2, 54) = 3.54, $p < .05$, $MS_e = 3.74$. Newman-Keuls tests performed on the mean final-draft totals in Table 3 indicated that the preliminary-draft format influenced the final drafts of only those writers with high verbal ability. For those writers, argument presentation was lower following the polished sentence format than it was following the unordered proposition format, $p < .05$; the control performance was intermediate and not significantly different from either experimental format, $ps > .05$. For writers with low verbal ability, on the other hand, argument presentation was approximately the same following the three formats, $ps > .05$.

Finally, more pro arguments were presented than con arguments, F (1, 54) = 46.26, $p < .001$, $MS_e = 5.45$. No other effects were significant.

Control format demands. Structure demands were self-imposed in the preliminary-draft control format. In order to assess the effects of these self-imposed demands, the preliminary drafts of writers in the control format were assigned to one of two categories: (1) sentence-based formats,

in which the majority of arguments were in the form of complete sentences, or (2) proposition-based formats, in which the majority of arguments assumed the form of single nouns or phrases that did not constitute a complete sentence. Assignment to these two categories was easily accomplished; interrater reliability was one.

Among the 10 control writers with average verbal ability, 3 used sentence-based formats and 7 used proposition-based formats; in contrast, among the 10 control writers with low verbal ability, 8 used sentence-based formats and 2 used proposition-based formats, χ^2 (1) = 5.06, $p < .05$. In addition, Newman-Keuls tests indicated that the production of preliminary-draft arguments was lower among control writers who used sentence-based formats (M = 4.0) than among those who used proposition-based formats (M = 8.4), $p < .01$; likewise, on the final draft, fewer arguments were presented by those who used sentence-based formats (M = 4.09) than by those who used proposition-based formats (M = 6.11), $p < .05$.

In general, the control writers who were free to use either sentence-based or proposition-based formats performed in much the same fashion as the writers who were assigned to experimental formats. Taken together, these findings suggest that structural demands inhibit argument production regardless of whether they are imposed by the experimenters or by the writers themselves.

Structure. The effects of writers' verbal ability and preliminary-draft format on structural characteristics of the final drafts were assessed by means of a multivariate analysis of variance. The same structural characteristics were included as in Experiment 1. All means are presented in Table 4. The multivariate analysis indicated that only writers'

Insert Table 4 about here

verbal ability produced a significant effect, F (4, 51) = 4.25, $p < .01$ (Wilks' lambda criterion).

Subsequent univariate analyses showed that writers' verbal ability had an effect on only three of the structural characteristics: sentence production, F (1, 54) = 9.33, $p < .01$, MS_e = 7.09, mechanics, F (1, 54) = 4.53, $p < .05$, MS_e = .03, and argument-presentation efficiency, F (1, 54) = 3.49, $p < .06$, MS_e = .06. As can be seen in Table 4, more sentences were produced by writers with average verbal ability than low verbal ability; fewer mechanics errors per sentence were made by writers with average verbal ability than low verbal ability; and finally, more arguments per sentence were produced by writers with average verbal ability than low verbal ability. The syntactic complexity of final drafts, on the other hand, was unaffected by writers' verbal ability -- an equivalent number of clauses per sentence was used by average and low ability writers.

In Experiment 1, argument-presentation efficiency was lower following the polished sentence format than following the unordered proposition format. Likewise, in Experiment 2, the argument-presentation efficiency of writers with average verbal ability was lower following the polished sentence and control formats than following the unordered proposition format (see Table 4); however, the univariate effects associated with the preliminary-draft format main effect, F (2, 54) = 2.61, $p < .08$, MS_e = .06, and the Writers' Verbal Ability x Preliminary-draft Format interaction, F (2, 54) = 2.53, $p < .08$, MS_e = .06, fell short of significance.

General Discussion

In order to produce a persuasive document, writers must do more than simply generate arguments. In addition, they must sequence their arguments, place them into sentences, and comply with the rules of sentence mechanics. According to a cognitive-demand interpretation of these results, each operation imposes a distinct demand on writers' limited processing capacities. The results reported here are consistent with the hypothesis that when content and structure operations are demanded simultaneously from writers, processing capacities are taxed severely. In Experiment 1, production was lowest when preliminary-draft arguments were generated in the form of sentences. Production increased significantly when arguments were generated in the form of ordered propositions. Finally, production was highest when arguments were generated in the form of unordered propositions. In the latter circumstance, both the sentence-formation operation and the sequence operation were eliminated. As a result, writers were able to allocate much more of their capacity to the task of argument production.

In Experiment 2, when structure operations were eliminated and additional capacity made available, writers with average verbal ability were able to use this capacity to increase their argument production. Additional capacity had no effect on the argument production of writers with low verbal ability, however. It seems that additional capacity can provide writers only with the opportunity to increase their pool of persuasive arguments; it cannot remediate deficiencies in ideational fluency.

The verbal ability of writers had an influence on document structure as well as document content. In particular, writers with average verbal ability produced more arguments per sentence than writers with low verbal ability. Structural efficiency of this sort usually is desirable. By editing out irrelevant content and using fewer words to communicate their arguments, writers can conserve both text space and the reader's time.

For both writers average and low in verbal ability, preliminary-draft arguments that were transferred during revision constituted the majority of final-draft arguments; comparatively few new arguments were constructed. Writers revised by culling final-draft arguments from a pool of preliminary-draft arguments. The size of this pool of preliminary-draft arguments was dependent upon the writers' verbal ability and the kind of preliminary-draft format they used.

In general, the knowledge that guides effective selection and implementation of task-relevant skills has been referred to as metacognition (Flavell, 1979). Metacognitive knowledge serves an executive function of coordinating and directing the individual's thinking and behavior when writing (Hayes & Flower, 1980), just as it does when reading (Myers & Paris, 1978) and when solving arithmetic problems (Resnick & Ford, 1980). In Experiment 2, such knowledge was reflected in a tendency to adopt formats that made possible the effective allocation of processing capacity. Writers with average verbal ability typically used proposition-based formats (e.g., proposition lists, outlines, and diagrams) when

constructing a preliminary draft of a persuasive letter. In each of these formats, a large pool of preliminary-draft arguments was displayed in a form that lent itself to rapid identification and comparison of raw ideas (Flower & Hayes, 1980; Glynn & Di Vesta, 1977). The use of such formats enabled writers with average verbal ability to reallocate processing capacity, and thereby produce additional arguments. Writers with low verbal ability, on the other hand, used proposition-based formats infrequently. There is probably little incentive for these writers to use such formats. After all, their use cannot remedy a relatively small, easily exhausted pool of arguments.

In conclusion, students of writing should be discouraged from attempting to draft "finished products" on their first try. The caveat that premature editing can block idea production is by no means new; however, empirical support for this notion previously has been unavailable. Advocates of "freewriting" techniques contend:

> Many people are constantly thinking about spelling and grammar as they try to write....Editing, <u>in itself</u>, is not the problem. Editing is usually necessary if we want to end up with something satisfactory. The problem is that editing goes on <u>at the same time</u> as producing. The editor is, as it were, constantly fiddling with what he's doing while he's in the middle of trying to do it. (Elbow, 1973, p. 5)

The present experiments provide empirical justification for the use of freewriting techniques. If argument production is the immediate concern of the persuasive writer, then sentence-formation and sequence operations should be postponed until later drafts of a document. When

these structure operations are postponed, processing capacity can be focused on the production of persuasive arguments in simple, proposition-like forms. This focus is achieved with little, if any, loss in the gross structural quality of the final drafts. However, it should be remembered that the value of freewriting techniques resides solely in their ability to temporarily direct processing capacity from structure considerations to content considerations. These techniques cannot be expected to remediate deficiencies in the persuasive argument production of writers with low verbal ability.

Writers in the present experiments received credit for those arguments that were plausible and logical. Implausible and illogical arguments were not considered (they constituted less than 2% of the arguments produced). This twofold distinction was highly reliable. However, more refined distinctions on a quality dimension could not be made. Such distinctions await the development of objective criteria for quality. In the absence of such criteria it is known that "a group of raters will assign widely varying grades to the same essay" (Cooper, 1977, p. 18).

Before these additional criteria can be developed, it will be necessary to identify the desirable components of a "high-quality" argument that distinguish it from an argument of lower quality. One set of criteria now being considered is based on Toulmin (1958): A high-quality argument may include supporting details that provide backing, and qualifiers that establish prerequisite conditions. When the desirable components of a persuasive argument have been identified, objective criteria then can be established to assess its quality.

Reference Notes

1. Frase, L. T. Literacy in technical environments. Paper presented at the meeting of the American Psychological Association, New York, September 1979.

2. Bruce, B., Collins, A., Rubin, A. D., & Gentner, D. A cognitive science approach to writing. (Tech. Report No. 89). Urbana, IL: Center for the Study of Reading, University of Illinois, June 1978.

References

Bereiter, C. Development in writing. In L. W. Gregg & E. R. Steinberg (Eds.), Cognitive processes in writing. Hillsdale, N.J.: Lawrence Erlbaum Associates, 1980.

Britton, B. K., Glynn, S. M., Meyer, B. J. F., & Penland, M. J. Effects of text structure on use of cognitive capacity during reading. Journal of Educational Psychology, in press.

Cooper, C. R. Holistic evaluation of writing. In C. R. Cooper & L. Odell (Eds.), Evaluating writing. Urbana, IL: National Council of Teachers of English, 1977.

Elbow, P. Writing without teachers. New York: Oxford University Press, 1973.

Flavell, J. H. Metacognition and cognitive monitoring. American Psychologist, 1979, 34, 906-911.

Flower, L. S., & Hayes, J. R. The dynamics of composing: Making plans and juggling constraints. In L. W. Gregg & E. R. Steinberg (Eds.), Cognitive processes in writing. Hillsdale, N.J.: Lawrence Erlbaum Associates, 1980.

Frase, L. T. Writing, text, and the reader. In C. H. Frederiksen, M. S. Whiteman, & J. F. Dominic (Eds.), Writing: The nature, development, and teaching of written communication. Hillsdale, N.J.: Lawrence Erlbaum Associates, in press.

Glynn, S. M., & Di Vesta, F. J. Outline and hierarchical organization as aids for study and retrieval. Journal of Educational Psychology, 1977, 69, 89-95.

Gould, J. D. An experimental study of writing, dictating, and speaking. In J. Requin (Ed.), Attention and performance VII. Hillsdale, N.J.: Lawrence Erlbaum Associates, 1978.

Gould, J. D. How experts dictate. Journal of Experimental Psychology: Human Perception and Performance, 1979, 4, 648-661.

Hayes, J. R., & Flower, L. S. Identifying the organization of writing processes. In L. W. Gregg & E. R. Steinberg (Eds.), Cognitive processes in writing. Hillsdale, N.J.: Lawrence Erlbaum Associates, 1980.

Johnston, W. A., & Heinz, S. P. Flexibility and capacity demands of attention. Journal of Experimental Psychology: General, 1978, 107, 420-435.

Kintsch, W. The representation of meaning in memory. Hillsdale, N.J.: Lawrence Erlbaum Associates, 1974.

Kintsch, W. Psychological processes in discourse production. In H. W. Dechert & M. Raupach (Eds.), Psycholinguistic models of production. Hillsdale, N.J.: Lawrence Erlbaum Associates, in press.

Klemmer, E. T., & Snyder, F. W. Measurement of time spent communicating. Journal of Communication, 1972, 22, 142-158.

LaBerge, D., & Samuels, S. J. Toward a theory of automatic information processing in reading. Cognitive Psychology, 1974, 6, 293-323.

Myers, M., & Paris, S. G. Children's metacognitive knowledge about reading. Journal of Educational Psychology, 1978, 70, 680-690.

Posner, M., & Keele, S. W. Skill learning. In R. M. W. Travers (Ed.), Second handbook of research on teaching. Chicago: Rand-McNally, 1973.

Resnick, L. B., & Ford, W. W. The psychology of mathematics for instruction. Hillsdale, N. J.: Lawrence Erlbaum Associates, 1980.

Schneider, W., & Shiffrin, R. M. Controlled and automatic human information processing: I. Detection, search, and attention. Psychological Review, 1977, 84, 1-66.

Toulmin, S. The uses of argument. London: Cambridge University Press, 1958.

Table 1

Argument Production Means (Experiment 1)

Preliminary Draft Format	Preliminary Draft Arguments			Final Draft Arguments				
				Repeated		New		
	Pro	Con	Total	Pro	Con	Pro	Con	Total
Polished Sentences	1.9	1.4	3.3	1.3	1.2	.2	.2	2.9
Mechanics-free Sentences	3.2	1.7	4.9	2.5	1.4	.7	.4	5.0
Ordered Propositions	6.1	2.2	8.3	4.0	1.5	.2	.9	6.6
Unordered Propositions	9.8	3.5	13.3	6.1	1.6	.1	.2	8.0
M	5.3	2.2	7.5	3.5	1.4	.3	.4	5.6

Table 2

Mean Structural Characteristics of Final Drafts (Experiment 1)

Preliminary Draft Format	Sentences	Clauses Per Sentence	Punctuation and Spelling Errors Per Sentence	Arguments Per Sentence
Polished Sentences	8.20	2.07	.43	.38
Mechanics-free Sentences	8.40	1.88	.26	.63
Ordered Propositions	7.80	1.86	.27	.89
Unordered Propositions	9.80	1.78	.23	.85
M	8.55	1.90	.30	.69

Table 3

Argument Production Means (Experiment 2)

Writers' Ability and Preliminary Draft Format	Preliminary Draft Arguments			Final Draft Arguments				
				Repeated		New		
	Pro	Con	Total	Pro	Con	Pro	Con	Total
Average Verbal Ability								
Polished Sentences	3.4	1.2	4.6	2.9	1.2	.4	.0	4.5
Control Format	5.2	2.7	7.9	3.5	1.9	.5	.1	6.0
Unordered Propositions	6.6	1.9	8.5	5.0	1.7	.8	.7	8.2
M	5.1	1.9	7.0	3.8	1.6	.6	.3	6.2
Low Verbal Ability								
Polished Sentences	3.7	.7	4.4	3.2	.4	.7	.3	4.6
Control Format	3.7	.4	4.1	3.2	.4	.4	.0	4.0
Unordered Propositions	4.0	.4	4.4	3.1	.1	.5	.0	3.7
M	3.8	.5	4.3	3.2	.3	.5	.1	4.1

Table 4

Mean Structural Characteristics of Final Drafts (Experiment 2)

Writers' Ability and Preliminary Draft Format	Sentences	Clauses Per Sentence	Punctuation and Spelling Errors Per Sentence	Arguments Per Sentence
Average Verbal Ability				
Polished Sentences	9.70	1.83	.22	.49
Control Format	12.70	1.56	.16	.47
Unordered Propositions	10.50	1.82	.10	.78
M	10.97	1.74	.16	.58
Low Verbal Ability				
Polished Sentences	9.40	1.74	.24	.48
Control Format	9.20	1.73	.25	.44
Unordered Propositions	8.00	1.78	.30	.46
M	8.87	1.75	.26	.46

Footnotes

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1. In the present context, the word "argument" is synonymous with "reason" and refers to a major proposition and its embedded propositions. The word is potentially confusing because it is also used (within the Kintsch system) to refer to a special component of a basic proposition.

2. In an unweighted means analysis performed on the preliminary-draft arguments, the preferred alternative factor (film vs. library reading session, $\underline{M}$s = 7.18 and 7.55, respectively) produced no significant main effect, nor did it interact with the preliminary-draft format, both $\underline{F}$s < 1, MS_e = 6.59. The results of an unweighted means analysis performed on the final-draft arguments were similar, both $\underline{F}$s < 1, MS_e = 2.58. Taken together, these findings suggest that the two alternatives were equally arguable.

3. The argument production scores presented in Table 3 can be compared with those in Table 1. As would be expected, the undergraduate students who participated in Experiment 2 produced fewer arguments than the graduate students who participated in Experiment 1.